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United States Department of Agriculture,

OFFICE OF THE SECRETARY.—Circular No. 40.

THE PRESENT OUTBREAK OF THE FALL ARMY WORM AND RECOMMENDATIONS FOR ITS CONTROL.

The Department of Agriculture is using all the means at its disposal to meet the emergency caused by the very great destruction of crops in the South by the fall army worm. This insect is present in unprecedented numbers from Louisiana and Arkansas eastward to the Atlantic Ocean, and is destroying corn, cotton, sugar cane, rice, and other crops to such an extent as to cause great anxiety on the part of planters and others. By means of an emergency appropriation by Congress it is possible for the Department to render quick assistance.

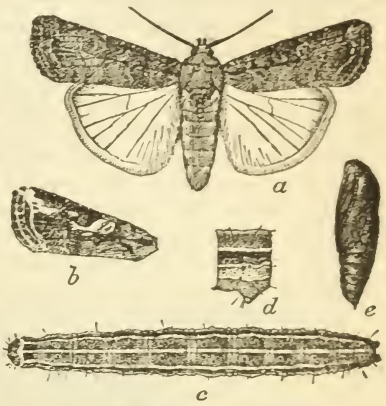

FIG. 1.—The fall army worm (*Laphygma frugiperda*): *a*, Moth, plain gray form; *b*, forewing of Prodenia-like form; *c*, larva extended; *d*, abdominal segment of larva lateral view; *e*, pupa, lateral view. *d*, Twice natural size; others enlarged one-fourth. (From Chittenden.)

Plans for this work, in cooperation with the States concerned, are being rapidly perfected. The insect will undoubtedly continue its ravages for some time unless checked. In all probability another brood will appear after the present one transforms in the ground. For these reasons immediate action toward destroying the worms is strongly advised.

The Department recommends the use of arsenicals. Among these are arsenate of lead, Paris green, and London purple. In most cases it will be best to apply these poisons in dry forms instead of with water. Dry applications can be made by sifting the poisons upon the plants through light cloth sacks or by means of blowers or dusting machines. Liquid applications must be made with spraying apparatus to be effective. For this reason the dry applications meet the present emergency better than liquid ones.

Arsenate of lead in powdered form is recommended above all other arsenicals because it will not injure the foliage of any of the field crops grown in the South. It may be applied without the addition of any carriers. Paris green is next in effectiveness, but should be mixed with its weight of air slaked lime or flour to prevent burning of the foliage, which is likely to occur if it is applied undiluted. London purple may be used, but should be applied with air-slaked lime or flour, as recommended in the case of Paris green. Wherever it is feasible to use liquid sprays, arsenate of lead in powdered form should be used at the rate of 3 pounds per barrel of water. Paris green should be used at the rate of about 10 ounces per barrel. It is best in case Paris green is used in this way to add 2 pounds of freshly slaked lime to prevent burning.

Whether dry or liquid preparations are used it is extremely important that the applications be made with thoroughness. In the case of

corn, some of the poison should be placed in the heart of the plant, where the greatest damage is done. A small amount is all that is required to kill insects. In the case of cotton, powdered arsenate of lead should be applied at the rate of about 5 pounds per acre. The usual method of utilizing cloth sacks carried through the field on horseback is perfectly adapted to this crop.

On forage crops and others in the case of which unfortunate results might follow the use of arsenicals, other expedients must be adopted. In pastures and in some instances on alfalfa many of the worms can be destroyed by the use of rollers or drags. In alfalfa that would be injured by rolling or dragging, the plants should be cut for hay. When the worms are forced from the fields by this means, many can be killed by means of drags or by plowing them under when they make their way to other fields. Immediately after cutting, alfalfa fields should be thoroughly disked. This will kill many of the worms before they can leave and will break up and destroy the cells of those that have gone into the ground for pupation.

The method of destroying the insects when they are in the quiet stage in the ground, to which reference has just been made, is of importance next to the use of arsenicals in checking the pests. In fact, in many cases it is by far the most effective means that can be followed.

For fields threatened with invasion but not actually attacked, a deep furrow should be plowed out around the entire circumference of the field; into this the caterpillars will fall, when they may be crushed by dragging a heavy log through the furrow. If the soil is such as to be somewhat impervious to water, this furrow may be kept partly filled with water, on the surface of which a small quantity of kerosene may be poured, which will kill the worms almost immediately when they come into contact with it.

Since the worms seem invariably to consume the grass and other vegetation growing in fields before attacking either corn or cotton, it should prove an important method of protection to spray or dust grass and weeds in cornfields threatened with attack with arsenate of lead according to the methods advised above.

Throughout the greater part of the South there is likely to be another destructive brood of the army worm which will come from the transformation of the present generation in the soil. Therefore every effort should be made to break up the pupal cells, so that the next brood will not appear. This can be accomplished by the use of plows, cultivators, and harrows. Wherever any crop which can be tilled has been injured by the fall army worm it is advised that further injury be prevented by the use of cultivators and harrows. Much good can also be accomplished by plowing fields or portions of fields where all of the crop has been destroyed. The treatment of bare places about cultivated fields in this way will be of assistance.

To summarize the situation, the Department recommends the speedy application of arsenical poisons and the working of the ground wherever practicable, in order to prevent further damage.

Warning.—Great care should be taken that cattle and other stock are kept from pasturing in the fields where the grass or other crops have been poisoned with arsenicals; also, that poisoned plants are not fed to stock.

JAMES WILSON,
Secretary of Agriculture.

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